

**EPA Comments on  
Capture Zone Field Test Plan; GASCO, Portland, Oregon  
Prepared by Anchor QEA LLC  
Dated September 2009  
Comments dated October 8, 2009**

EPA's review and comments of the Capture Zone Test Plan focus on the information and references to construction and design details of the offshore piezometers. This information is found in Section 3.3, Figures 1 through 3 and Table 1 in the document, as well as pages 2 through 3 of Appendix A, which is a memorandum from Anchor QEA dated August 14, 2009. We have also reviewed responses from Anchor QEA in an email dated October 2 that responds to an ODEQ email dated September 30, 2009 that requested additional details on the existing and proposed offshore piezometers.

General Comments

**Comment 1** – Information related to design and construction of the offshore piezometers should be more descriptive and provided in a separate set of drilling, well completion and development specifications. These specifications should be provided to the Driller and field crew so that there is a clear understanding of what is and is not acceptable during all phases of offshore piezometer installation. Examples of specificity include: Products to be used (casing, screens, sealing/backfill materials, tolerances, purity, etc...) and Execution which outlines proper use of the specified products for installation of the offshore piezometers and containment of waste generated from the drilling equipment.

**Comment 2** – The discussion on piezometer well installation does not reference State of Oregon well construction regulations. These regulations should be referenced as necessary to confirm that all well construction materials and methods meet these regulations.

Specific Comments

**Comment 1 (multiple-parts)** – Bullet #3, October 2, 2009 email response – The response does not provide enough information to ensure there will be no bridging, improper filter pack placement (native slough) and potential sonic borehole casing lock during piezometer installation. Guidelines should address:

- Criteria for the borehole to be considered stable prior to initiating piezometer installation.
- Contingency plans for drill cutting settlement and/or heaving sediment conditions within the borehole at completion depth.

- Threshold footage of material allowed and maintained within the annular space (either filter pack, or seal materials) between borehole casing and 2-inch piezometer during the completion phase.
- Instruction for the field personnel/driller to measure and maintain the threshold footages. For example, the sonic casing borehole pullback should be limited to a distance (to be specified) much smaller than the total footage of material allowed inside the annular space (to be specified) and measured to ensure material remains within annular space at all time during borehole casing extraction.
- Pre-build volume calculations based on the design depth of the piezometers for the field crew to confirm that a proper amount of material (sealant and filter pack) was used to fill the annular space and is completed at specified thicknesses across the entire length of the installed 2-inch piezometer.
- Thresholds for rejection, abandonment and redrilling of piezometer. For example – compromised screen placement of a specified depth.
- Abandonment contingency plan and procedures.

**Comment 2 – Table 1** – There is concern that the current design depth for the piezometers as shown on Table 1 is rigid and will not be revised based on subsurface characteristics logged and encountered in the field during drilling. Although important to show anticipated depths, they need to be qualified in Table 1 that actual depths may differ depending on actual lithology during drilling.

**Comment 3 – Response to first question in October 2, 2009 email** - Details on the methodology and sampler chosen for collecting the continuous cored borings should be provided.

**Comment 4 – Section 3.3, page 6, Paragraph 2** – The rationale and criteria (e.g. lithology) used to determine in the field when the desired completion depth was reached for the existing piezometers and will be for the proposed piezometers should be provided.

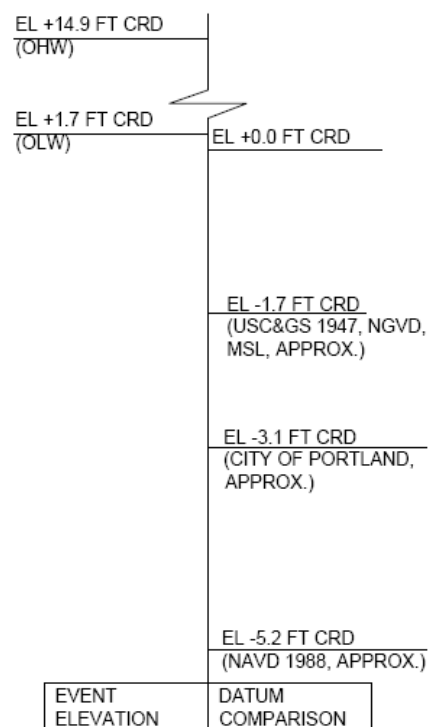
**Comment 5 – Section 3.3** –As-built drawings for the existing piezometers (PZ1-5, PZ1-20, PZ2-5, and PZ2-20) should be provided.

**Comment 6 – Section 3.3, page 6, Paragraph 1** – Elaborate on the testing of the existing piezometers and how they “confirmed the technology provides representative groundwater hydrologic measurement in the river sediment”

**Comment 7 -Figure 3** – There is a concern that the deeper piezometer completions, as they are currently shown, only screen the upper, more permeable and thicker sand unit and will not properly represent the entire flux within this unit. It is possible that the shallow piezometers would respond, even show a gradient reversal, to shallow pumping in this sand unit, but not represent complete capture of potentially deeper contaminated groundwater flux towards the

river through this thick unit. NW Natural should consider the potential for a deeper groundwater flow component to the river within this thick sand unit and present a piezometer installation plan that accounts for this possible flow.

**Comment 8 – Table 1, Figures 2 and 3** – references to "msl" need to represent a consistent datum and be consistent with the Siltronic datum. Table 1 and Figure 3 indicate City of Portland Datum while Figure 2 has no datum reference. It is important that a consistent datum be used and cross referenced to known datums used in the area. An example of a cross reference is provided below from Port of Portland maps Early Action Characterization Report Figure 5-27, September 2004



CRD: Columbia River Datum

USC&GS: US Coast & Geodetic Survey

NGVD: National Geodetic Vertical Datum

NAVD: North American Vertical Datum

OHW: Ordinary High Water Between  
Willamette River Mile 4 and 5

OLW: Ordinary Low Water at River Mile 4.5

MSL: Mean Sea Level (1947 Adjustment)

Example Conversion:  $NGVD = CRD + 1.7$